The MAC Flyer

APRIL 1975

THE SOUTH AMERICAN WAY. PAGE 13.

The MAC Flyer

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For Greater Efficiency
in MAC Air Operations

APRIL 1975 MAC RP 127-5 VOL XXII, NO. 4

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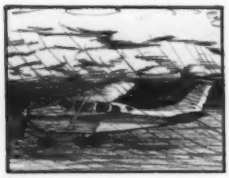

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Flyer Call

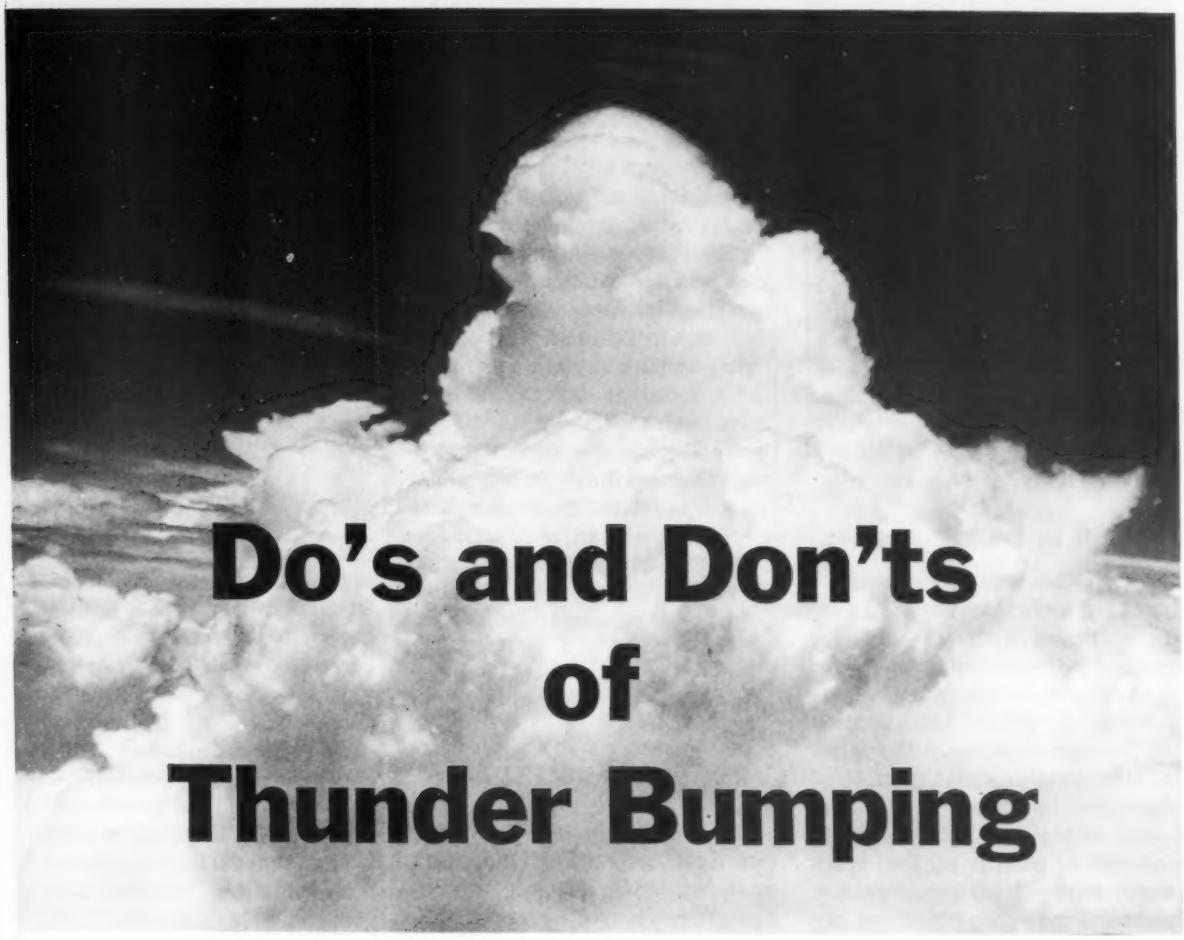
Recent consolidation of the airlift forces has brought so many changes in MAC that we editors on THE MAC FLYER are finding it increasingly difficult to keep pace with the whos, whats, whys, wheres, hows, and whens of our fellow aviators. And that bothers us because if we aren't on the same frequency as our readers, then we can't effectively perform our number one function of reaching crews through these pages.

Hopefully, by now most of the new flying units in MAC have established requirements for the magazine. We've also heard from some of you out there concerning safety awards, which are also handled by the same division (IGFE) that publishes THE MAC FLYER. But we would like to hear more because there's a great deal that the editors don't know about the tactical airlift business. And we can't write about it if we don't know about it.

Nevertheless, we do want to get you guys into print (not as statistics, please). In short, we are extending you a special opportunity to tell the rest of MAC just what you're all about. The editors here are really big on publishing letters from the troops in the field — and articles as well.

So why don't you take this opportunity to be heard? After all, we wouldn't want you to remain strangers.

Want to avoid the kind of headaches induced by severe weather? Throw away the aspirins and home remedies and USE EXTREME CAUTION.



Do's and Don'ts of Thunder Bumping

Here we are once again. It's the time of year when seasonal contrasts between cold and warm weather fronts spawn lines of vicious thunderstorms throughout much of the United States and other parts of the world. Need we bother to mention that punching a fragile aircraft through such weather can ruin an aircraft as well as a crew's whole day? So here are just a few thoughts on techniques to get you through the 1975 severe weather season without any confrontations with the dangerous by-products of such storms.

Before settling down to fill out a flight plan, duck into the weather station to see whether severe weather exists or is forecast along the proposed flight plan route. In order to avoid nasty weather, a pilot must first know where it is and where it's likely to go. Even if the weather has been clear for a week's worth of locals and weather briefings have seemed more or less like a square-filling exercise, don't assume the "hot and dusty" attitude toward weather briefings. Things may have changed. So get friendly with the weather expert behind the counter. Pick his brain for all manner of severe weather information along the route of flight, destination, and alternate. Check Pireps, cloud tops, coverage (scattered indicates up to 45 percent coverage), cell movement, turbulence, wind shear, precipitation intensity, and whatever else that could tighten pucker strings. Last sum-

Thunder Bumping

mer a C-141 crew flew their bird into some powerful CBs over Texas and in the process injured passengers and gave some sheet metal specialists some unexpected work. Apparently this crew

"Aircraft will not take off or land when heavy rain associated with thunderstorms is reported or encountered at the airfield or when severe turbulence has been reported in the airport traffic area." (AFR 60-16/MACSUP 1)

checked destination weather, but not en route weather, before and during flight.

Watch It on Takeoff

Don't overlook the departure phase of flight. Many aircraft have been thrust violently into the ground by capricious cells poised just off the departure end of the runway. Some military weather stations are equipped with sophisticated weather radar capable of "painting" all points of the compass within approximately 200 miles. One peek is worth a thousand words. If icy green echoes pepper the departure route, *don't* fight them. Just fall back and regroup around the radar machine until the cells have dissipated or moved out of the area.

Departure delays, maintenance, late-arriving passengers, ATC delays, and the like can ease a crew behind the weather power curve. Weather changes may occur during these delays and render preflight weather briefings invalid. When delay exceeds one hour, a weather update is required. Don't assume that in-flight weather will remain as briefed while maintenance repairs a leaking flight control actuator. Have another chat with the weatherman and another look at his radar. It's cheap insurance.

What is that marvel of man's ingenuity that can rhythmically probe the sky ahead, often detecting towering cumulus cells disguised in sheep's clothing of cirrus, stratus, and altocumulus? Radar, that's what. Without it, severe weather avoidance can be a real hassle. Few situations can tighten a pilot's jaw as much as flying in the soup with a busted radar, realizing that CBs are out there — somewhere. *Don't* attempt flights through thunderstorm areas without an operational radar unless it can be done visually. Even then, keep your distance. If your radar is inoperative or fails to check out, get it repaired prior to takeoff. That "scattered CB" forecast for the next leg may include a sizable number of fifty-granders imbedded in the cirrus.

Call the Nav

While on the subject of radar, the man behind the scope on many of MAC's airlifters is the navigator. He may be the only member of the crew who has received specialized formal training in radar theory, interpretation, utilization, mechanics, and weather avoidance. If there is a likelihood of springtime and early summer crud along the way, clue the nav in to this possibility. Give him time to thoroughly check and calibrate his radar machinery before pulling the chocks. As the flight progresses, pass him all available weather information from Metro, Flight Service, or other aircraft. Better yet, if conditions permit, give the nav control of the UHF or VHF and let him perform the weather-related communications. But regardless of who does the calling, *don't* keep the rest of the crew in the dark. Communication breakdowns between pilots and navs have cost MAC dented wings, engine nacelles, and radomes.

Truck On

Several years ago, two airline captains viewed a black, seething horizon beyond the departure end of the airport. One of the captains decided to delay his takeoff until the squall line moved off to the east. The other elected to press on against the cautions of his contemporary. The jet roared down the runway and quickly disappeared into the black mass. Radar contact was soon lost. Later, crash crews discovered parts of the wreckage floating in a lake — a result of overconfidence.

Don't fly into known thunder-

"Aircraft will not be operated into areas of known or forecast thunderstorms without an operational airborne radar capable of detecting such thunderstorm activity unless IFR flight can be conducted through the area visually." (AFR 60-16/MACSUP 1)

storms. It's dumb — pure and simple. And taking off into severe weather is even worse. Accelerating to climbout speed with gear retracting and flaps and slats hanging, a large swept-wing jet has relatively little aerodynamic cushion over a stall envelope. Sudden entry into a weather regime of violent vertical updrafts and downdrafts can easily distort a climbing jet's aerodynamic

equation beyond the critical angle of attack. In addition, the raw vertical power of convective activity may prove too powerful even for the clever creations of Messrs. Pratt and Whitney to overcome. Add turbulence, lightning, hail, heavy precip, and the like to a floundering jet clawing for altitude and you have an accident likely to happen.

Don't take off until the mess moves away from the airport. Most cells move rapidly (20 to 35 knots). Obtain progressive radar updates. When the weather shows definite signs of improvement, truck on. It's a lot easier on man, machine, and the cleaning bill.

Familiarity with weather patterns before flight should enable a crew to achieve an optimum weather avoidance profile during climbout and cruise. But *don't* allow the tentacles of complacency to choke crew coordination and weather vigilance. Even the most astute weather forecasters have been humbled from time to time by freakish weather happenings. Keep the machinery behind the radome humming and scanning the sky ahead. If cells do materialize and block the road ahead, take a detour. But *don't* forget to advise center of planned deviations.

A lengthy line of thunderstorms confronts a crew with a number of difficult options: paralleling the line to find a way around, climbing to top the line, punching through a "sucker hole," or executing a 180-degree turn. Paralleling may take awhile and may be fuel consuming. If aircraft fuel consumption is running tight, it might be advisable to land at a base or airport ahead of the front, refuel, and sit tight until the situation improves. Radar assistance in determining the dimensions of a weather line can be obtained through military Metro facilities, center radar (air traffic permitting), and other air traffic. And don't overlook FAA Flight Service Stations (FSS) for current weather data. Some FSS sites are equipped with weather radar and all receive hourly computer weather updates from the weather center in Kansas City. Special weather observations are transmitted to Kansas City and relayed immediately to Flight Service Stations around the country. Switching to 255.4 UHF or 122.0 VHF may provide just the right weather information to make a decision.

"If airborne radar fails while operating in areas of known or forecast thunderstorms, or if a non-radar equipped aircraft encounters unexpected areas of thunderstorm activity, the air traffic controlling agency will be so advised and alternate routing and/or radar vectoring service will be requested." (AFR 60-16/ MACSUP 1)

From a distance, climbing to a higher flight level may appear to be the best solution. But *don't* be deceived. Well-organized lines of growing buildups can easily outclimb a jet transport. Further climb to flight level 390, 410 or higher may force most aircraft into an aerodynamic dilemma known as the "coffin corner." In such a box canyon, flanked by converging mach and stall limits, an aircraft has little margin in which to maneuver safely and is more susceptible to upset.

A break or trough in a line of thunderstorms may invite a way through, but such sucker holes have a way of slamming shut soon after entry. Even if visual passage is possible, adjacent cells are likely to fill the gap with severe turbulence, cloud-to-cloud lightning, and possible hail. Above 23,000 feet, apply a 20-mile separation from cells. Below 23,000 feet maintain at least a ten-mile separation when the temperature is below 0°C and five miles when the temperature is above 0°C. Monitor radar returns closely. If cells begin to merge and the gap starts filling in, *don't* get caught inside. A 180-degree turn may be your only prudent choice.

Down the Chute

Destinations are not immune to fast-moving cold fronts and associated boomers, either. Before starting down the chute, call Metro and get the latest weather, including current radar returns. If severe weather is making life difficult below at Full Stop AFB, don't join the crowd. Fuel permitting, hold in a clear area until conditions improve. Whether a pilot elects to hold or divert to an alternate depends on many variables. But *don't* attempt an approach beneath or through a thunderstorm. An aircraft configured for landing doesn't stand much chance making it to the runway for the very same reasons that one shouldn't take off into violent weather. It's a hazardous flirtation where no one can accurately predict how a cell is going to treat an airborne intruder.

Remember, the name of this game is *don't*. The best rule of thumb for those of us who travel the skies is *don't* venture into a meteorological condition that doesn't look inviting.

Take a Good

Some of the most hair-raising flying stories come from helicopter pilots, the so-called fling wingers, whose machines lend themselves to maneuvers and temptations quite foreign to fixed wingers.

Traditionally, chopper pilots like to talk about these experiences, a fact that is reflected by the number of articles they author for THE MAC FLYER.

Flying at low altitudes, in mountainous terrain, and, very often, in areas of dense air traffic, provides helicopter pilots with a lot to talk about. Whiteouts during winter landings and takeoffs, settling with power, and updrafts and downdrafts during low level operations are a few more of the hazards.

To obtain their impressions and attitudes toward accident prevention, a safety survey was conducted among pilots of the 1551 FTS at Hill AFB, Utah. To ensure their real feelings would be transmitted, they were requested to respond anonymously.

Here are some of the responses from the 40 pilots, whose average flying time is about 3,500 hours:

1. Only ten said they had never deviated from a flying regulation. Twenty-five of the 30 who admitted deviations or noncompliance said they had done so on purpose during the early years of their flying careers.

2. Younger pilots said they did not feel they had deviated any more than their older counterparts. Their impression is probably very valid since the older pilots probably did not have the close monitoring and supervision prevalent today.

3. Eighteen of the 40 pilots admitted having been frightened in noncombat flying (presumably most who had flown in combat had known fear) at least once prior to reaching the 1,000-hour mark. Incidents causing this fright occurred between 500 and 700 hours, about the point at which they were being checked out as aircraft commanders.

4. The other 22 pilots experienced fright be-

MAC's rescue helicopters used in the training mission at Hi
HH-53 Super Jolly Green, HH-3 Jolly Green.

Look — We Did

by Capt Bennie D. Orrell
1551 FTS
Hill AFB, Utah

FB; clockwise from top left, HH-43 Huskie, UH-1N Huey,

tween 1,500 and 5,000 hours, evidence that experience alone is not enough to keep anyone out of a fearful situation.

5. Seventy-five percent of the pilots added that the greatest potential danger in their flying environment was the midair collision. Indigenous to the Hill AFB flying area are F-105s, F-4s, T-33s, H-43s, H-53s, H-3s, HC-130s, H-1s, B-52s, KC-135s, various types of transient aircraft and light, civilian aircraft. The light, private aircraft gave the pilots most concern. Many of these private planes have no radios and are not transponder-equipped. This makes it difficult for ground radar to detect their presence.

6. Twenty-three percent of the pilots believed that working at high density altitude presented the greatest hazard. The prospect of "settling with power" loomed as a very real threat to them. Operating with minimum power reserve also caused concern.

7. The remaining two percent listed as prime dangers items ranging from complacency, students who are allowed to go too far, and pushing to get the mission accomplished in marginal weather.

8. One surprising response was that a few of the pilots listed restrictive regulations as a possible hazard. For example, if a problem arises with the helicopter, the pilot has the authority to set it down in any suitable clearing. When this happens, he must obtain official approval before flying it again. And this can take time. Some pilots felt that occasions may arise in which a pilot may risk returning home with a malfunctioning helicopter rather than land it, find a correctable problem, and wait hours before getting approval to fly it out.

If the results of this survey were less than dramatic, they do tend to identify those hazards which some of MAC's most experienced helicopter pilots feel they face each day. And one of the basic premises of any safety program is that once a hazard is identified, it becomes easier to avoid.

Major Foster and Crew

GOOD SHOW

Pictured: Back row, left to right: TSgt Kenneth P. Marschke, flight engineer; SSgt Park E. Johnson II, loadmaster; TSgt Lenard D. Kelley, flight engineer; SSgt Kenton L. Hahn, flight engineer; front row, left to right, SMSgt Tony R. Barentine, loadmaster; Maj Edward J. Biron, navigator; Maj Stephan R. Foster, aircraft commander; 2d Lt Paul M. Hubble, Jr., copilot.

Not pictured: 1st Lt Robert D. Coviello, copilot.

Maj Stephan R. Foster, cruising homeward toward McGuire AFB, N. J., obtained clearance to descend his C-141 to smoother air some 4,000 feet lower.

Shortly after level-off at flight level 350, the aircraft experienced explosive decompression. Fog filled the cockpit and wind howled through the fuselage. Donning his oxygen mask, Major Foster began a gradual descent while his crew checked over their oxygen equipment and inspected the aircraft for damage. Since the number one hydraulic system suction boost low pressure warning light was illuminated, the crew shut down the number one system.

During decompression, the flight deck entrance door had slammed shut and disintegrated, scattering debris over the cabin floor; but the major damage was confined to the rear of the aircraft where the pressure door, the ramp, and the petal doors had blown off. Although there had been some damage to the hydraulic components in the tail area, flight control response was not affected. Power was restored to number one hydraulic system a short time later when the suction low pressure indication disappeared.

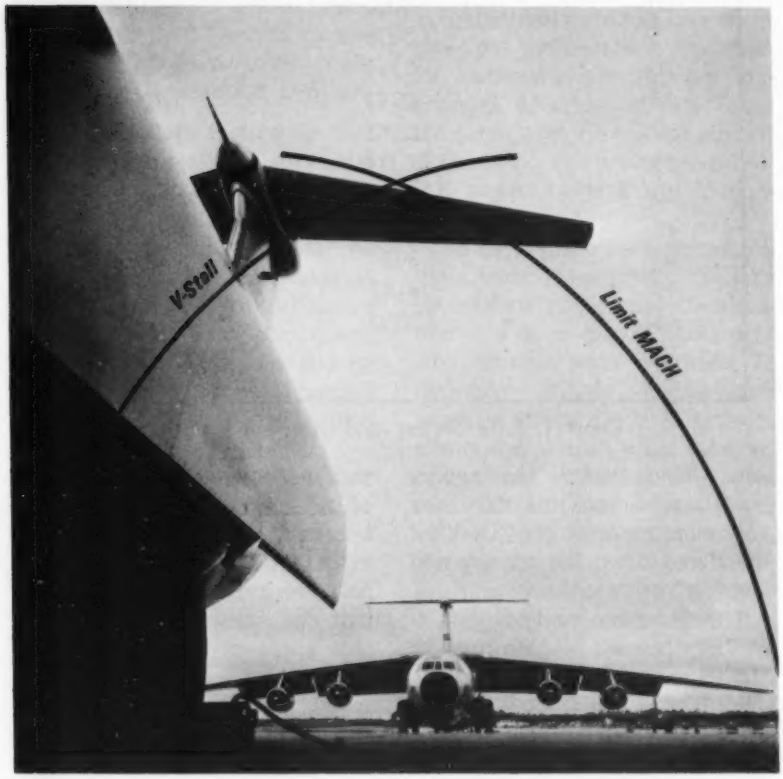
Major Foster leveled at 10,000 feet and maintained 180 to 200 knots while establishing Conference Skyhook. Since the weather forecast indicated poor landing conditions at McGuire and Pease AFB, N. H., Major Foster chose to land at Loring AFB, Me. Meanwhile, the flight engineers, noting indications of flap assymetry caused by the broken cable detection device, reset the flap assymetry system. It was then that they noted a small leak on the number two system. Since the hydraulic quantity on this system could not be replenished, the crew decided to lower the landing gear and shut down the system until just prior to landing.

To make a possible go-around easier, Major Foster elected to land with takeoff/approach flaps. With the gear down, flaps set, and number two system power restored, he landed at Loring.

Later, it was determined that the decompression had been caused by the ramp separating from the fuselage.

Major Foster, a flying safety officer of the 438 MAW at McGuire, and his crew, of the 6 MAW, displayed outstanding judgment and professional skill in responding to this critical situation. Good Show!

C-141 Operations in Coffin Corner



by Lt Col Charles L. Pocock
AFISC/SEFB
Norton AFB, Calif.

Even an overpowered aircraft can meet its match. The limitations of mach and V-stall may cause a Starlifter problems when it ventures too far from mother earth.

A C-141 sat on the taxiway just off the approach end of runway 18 at Yokota. All four engines were turning while the crew impatiently waited for their clearance to come through.

"MAC One Seven Zero," the tower called. "ARTC wants to know if you can accept flight level three seven zero."

"Ah, stand by one," the pilot replied. The navigator and engineer worked together swiftly, cross-checking each other's work. Brake release gross weight would be 309,000 pounds. Temperature was standard. Their gross weight, reaching flight level 370, would be 300,000 pounds and the 300-foot-per-minute climb ceiling would be 37,100 feet. They could do it. They quickly relayed the information to the pilots. The aircraft commander nodded and the copilot passed it to the tower. Their clearance came through minutes later.

"MAC Six Zero One Seven Zero is cleared as filed. Maintain flight level three seven zero. Departure instructions: Climb on runway heading to one zero thousand, reverse course and proceed directly to Niigata. Climb so as to cross Niigata at flight level three seven

Coffin Corner

Bank Angle Degrees	Load Factor	Effective Weight Pounds
00	1.0000	300,000
5	1.0038	301,140
10	1.0154	304,620
15	1.0353	310,590
20	1.0642	319,260
25	1.1034	331,020
30	1.1547	346,410
35	1.2208	366,240
40	1.3054	390,162
45	1.4142	424,260
60	2.0000	600,000

Chart 1, load factors and effective weights.

zero. Read back." The copilot quickly read back the clearance and minutes later the Starlifter thundered down the runway and lifted off.

The departure worked perfectly. They crossed Niigata right at flight level 370, with a gross weight of 300,000 pounds, and the recommended climb Mach of .70. As the needle swung, showing station passage, the copilot began his position report and the aircraft commander engaged the altitude hold on the autopilot and rolled into a 30-degree banked turn toward Sendai. A routine mission so far, but this crew is only seconds from possible disaster. Unless they do something quickly, they will soon learn firsthand why this portion of their aircraft's performance envelope is called — "Coffin Corner."

To fully understand the problems they face, let's leave our crew up over Niigata and take a quick look at some fundamentals.

An aerodynamic stall is a condition in which the angle of attack becomes so large the flow of air over the top of the wing breaks down and the wing can no longer produce enough lift to support the aircraft. The *only* thing that can cause a stall is excessive angle of attack. The wing angle of attack is a function of airspeed, load factor, gross weight, and altitude. It can also be affected by wind conditions, but we'll discuss that later. An aircraft can be stalled at any airspeed, altitude, or power setting.

Chart number one illustrates the effect of bank angle on load factor in level flight at a constant airspeed. An increased load factor effectively increases gross weight so more thrust is required to maintain altitude and airspeed. At the 300-foot-per-minute climb ceiling, there is very little excess thrust available. At sustained bank angles of much over 10 to 15 degrees, either altitude or airspeed will probably be lost.

An increase in altitude will cause the stall speed to increase. There are several reasons for this effect. In the C-141 and other aircraft which have CADC systems, the airspeed indicators show calibrated airspeed. But stall speed is dependent upon equivalent airspeed. For the same equivalent airspeed at higher altitudes, the calibrated airspeed will be greater. An increase in altitude will also alter the viscosity effects of the air and, generally speaking, cause the indicated stall speed to increase. This is usually significant only above 20,000 feet. The Dash One applies these corrections and figure A8-3 on page A8-8 of T.O. 1C-141A-1-1 shows very clearly that calibrated stalling speed increases with altitude. Chart number two shows various bank angle stall speeds at different altitudes and includes the reduced calibrated airspeed values at different Mach numbers. This is the "Coffin Corner Chart." Let's use it to analyze the problems facing our hypothetical crew over Niigata. They are at 37,000 feet, Mach .70, in a 30-degree bank. Notice that their calibrated airspeed is 220 knots and their stalling speed is 210! They have only 10 knots to play with, and with the addition of any one of a number of other factors, they might lose that.

If a flight control or an autopilot malfunction increased the bank to 35 degrees, the aircraft would stall.

Or, consider the load factor. In a 30-degree bank, their load factor is 1.15. Their 300,000 pound aircraft effectively weighs 345,000 pounds and is several thousand feet above its absolute ceiling! The autopilot altitude hold, trying to maintain altitude, rolls in nose-up trim. As the turn progresses, the angle of attack increases, the airspeed decreases, and when the Mach falls to .66,

the aircraft stalls at 30 degrees of bank.

The C-141 has a stick shaker designed to provide the pilots with extra warning of an approaching stall. However, if you'll check the shaker onset speed chart in the 1-1, you'll find that in the conditions we've described, the shaker probably wouldn't activate until after the aircraft had stalled. The crews only warning would be natural buffet. If they were experiencing light turbulence at the time, they might not recognize the buffet until a deep stall had developed. At night or in weather, recovery would become a very sporty course indeed. The stick shaker was designed primarily to warn of approaching stalls in the low altitude, low airspeed region of flight. In the upper extremities of the performance envelope, it may or may not give adequate warning.

Turbulence is another important consideration to the wary pilot operating near coffin corner. "Descend to 4,000 feet below the 400-foot-per-minute climb ceiling." Does that sound familiar?

Remember, we said earlier that a stall is the result of excessive angle of attack. And angle of attack is the angle between the relative wind and the chord line of the airfoil. Since one side of this angle is wind, and turbulence may be considered as wind gusts, turbulence can and does change angle of attack. These changes are produced mainly by vertical gusts rather than horizontal.

Consider a heavy aircraft and a light aircraft encountering the same gust. The angle of attack increase is the same, but the gust will cause greater acceleration on the light aircraft. The moderate turbulence reported by the light weight inbound aircraft may seem like light turbulence to the heavier outbound aircraft. But the changes in angle of attack are the same, and the heavier aircraft is operating at a much more critical angle of attack and is more subject to stall.

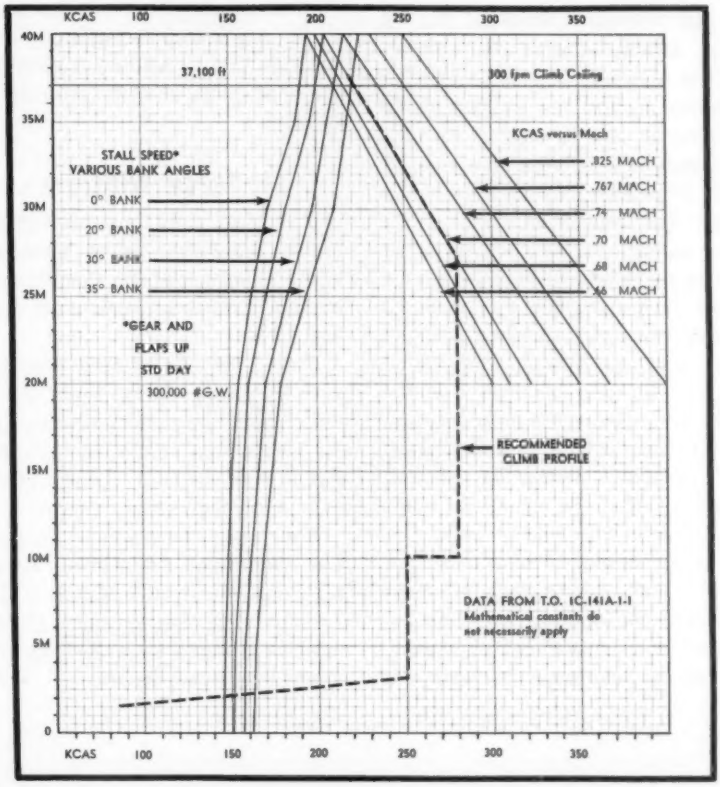
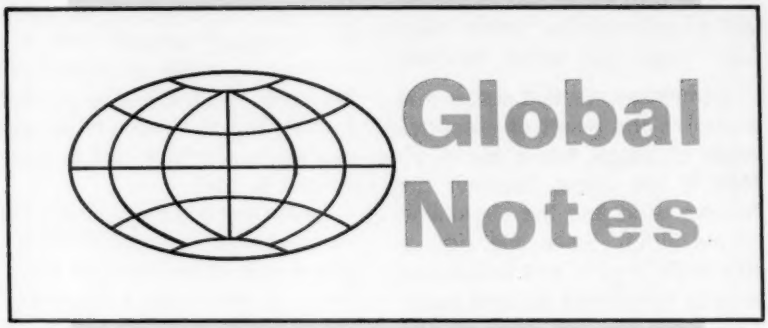


Chart 2, limiting mach and stall limits.

So far we have been discussing the effects of up gusts. Now let's take a look at the opposite situation — a down gust. A down gust will decrease angle of attack. To maintain altitude, the aircraft must, in effect, climb. In order to climb, the aircraft must have excess thrust available. At or near the 300-foot-per-minute climb ceiling, there is very little excess thrust remaining. An aircraft cruising this high will probably not be able to tolerate even "light chop" and maintain altitude.

It should be apparent by now that operations in the upper corner of the cruise envelope are maximum performance maneuvers as much as a six G pitchout. If you have not yet modified some of your ideas about coffin corner flying, consider this: at Mach .767, wings level, at the 300-foot-per-minute climb ceiling, your airspeed is just about 1.3 V stall — the same relative speed we use on final approach! How much angle of bank would you use on final, and how much airspeed would you be willing to give up during that bank before you did something about it?

The next time someone asks you how the C-141 flies above 30,000 feet, answer him, "Fine, but very carefully, with shallow banks and lots of airspeed!"



award winners

MAC Distinguished Individual Safety Awards were earned by the following personnel for their dedication and professionalism in the performance of their duties:

Maj Charles Erni and MSgt Theodore L. Roth, 9 WRW, McClellan AFB, Calif. The nose gear on their WC-135B failed to register "up and locked," after a touch-and-go. All efforts to insert the landing gear pin manually were unsuccessful. An unscheduled air refueling gave added time for a Conference Skyhook, and technicians suggested forcing a small screwdriver into the gear pin hole and applying pressure on the nose gear drag strut. After several attempts, Sergeant Roth was finally able to insert the gear pin, although cockpit indicators continued to indicate an unsafe nose gear. A normal landing was possible, thanks to the cool handling of the emergency by Major Erni and Sergeant Roth.

Sgt William F. Wadford, Det 13, 41 ARRW, Osan AB, Korea. When Sergeant Wadford observed flames around the engine intake during an HH-3E engine start, he immediately notified the pilot of the impending dangerous situation. The pilot initiated internal fire emergency procedures while Sergeant Wadford started up the side of the aircraft with the external fire hose. He soon realized the internal fire extinguishing agent had not reached the fire area and alerted the crew to abandon the aircraft. With little regard for personal safety, he started fighting the fire and, although exposed to the highly toxic fire fighting chemical, fought the fire until it was extinguished. He then assisted the copilot, who had received some chemical overspray, to the shower area to wash off the agent. Sergeant Wadford's alertness in recognizing an extremely hazardous condition and his skilled response averted possible destruction of an aircraft and injury to personnel.

Capt Robert M. Anderson, 1551 FTS, Hill AFB, Utah. While performing Supervisor of Flying (SOF) duties, Captain Anderson noticed a red fluid draining from the nose wheel well of a taxiing HC-130 aircraft. He quickly notified the crew, and the aircraft was stopped. Upon investigation, a broken hydraulic line was found. Had taxiing and the use of brakes continued, the utility hydraulic system would have been depleted. Captain Anderson's vigilance and rapid action prevented a possible collision with another aircraft or object.

air force winners

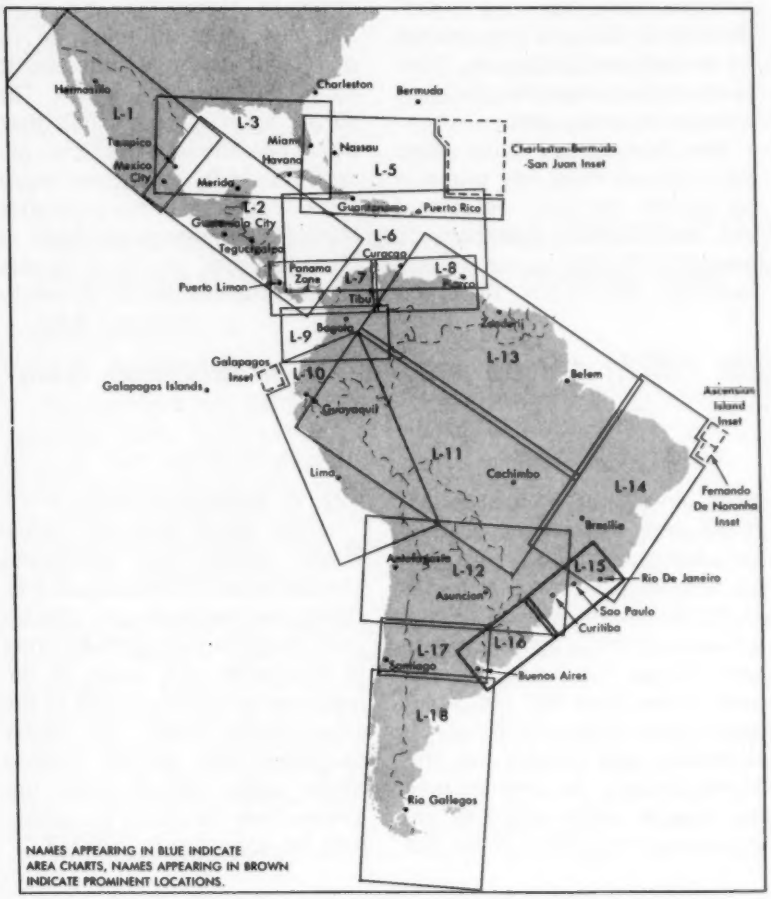
Two MAC units have been chosen by Air Force to be awarded USAF Flight Safety Certificates for meritorious achievements during 1974:

The 39th Aerospace Rescue and Recovery Wing, Eglin AFB, Fla., from 5 August 1972 through 30 September 1974, completed more than 67,000 flying hours with a perfect safety record.

The 56th Aerospace Rescue and Recovery Squadron, Korat AB, Thailand, from 1 March 1967 through 30 September 1974, completed more than 68,000 accident-free flying hours.

The South American Way

by Lt Col John W. Ray
Supervising Editor



A whole new world awaits aircrews whose missions take them south of the border. And you don't have to land to discover the rule books are often different.

Aircrews accustomed to operating in the United States and Europe will find flying into many sections of South America a little like turning off an interstate highway onto a country road.

The going can be rough and the penalty severe for the unprepared, a fact supported by the results of a COMAC-directed survey into South American airfields used by MAC aircraft.

Gen Paul K. Carlton directed

The South American Way

the survey after an investigation into a C-141 crash last year suggested that unchronicled hazards in South America might be even more widespread than aircraft operators previously believed.

The survey team (or task force) was headed by Col Robert A. Johnston, Jr., Deputy Director of Safety, Headquarters, MAC. Fourteen Air Force representatives and one from FAA were on the team.

Visiting 15 airfields in 10 countries, the team conferred with various national officials, U. S. military personnel, and airline representatives. The result was a comprehensive, 154-page report which not only detailed some of the different procedures used in South America, but incorporated recommendations.

SURVEY FINDINGS

One of the most obvious findings was that there are too few navigation aids in South America (more than half of which is mountainous), although the quality of existing aids is generally good. Consequently, aircrews experience difficulty in determining the exact position of their aircraft over many of the air routes. For example, one airway used by MAC aircrews is 552 n.m. long and has no en route navigation aids. Other routes extend more than 900 n.m. without en route aids.

The many crews flying along such airways must rely primarily on aircraft computer equipment and their own computations to navigate. Remaining on airways becomes particularly important since airway width, an important factor when considering obstruction clearance criteria, varies from 10 n.m. wide in some countries to 21.58 n.m. in others. The significance of this is that a compass error of four degrees at the midpoint of two fixes 800 n.m. apart would compute to 26.68 n.m. off centerline, well outside the protected airspace. An error such as this may be compounded by unsteady bearing pointers as the distance between fixes increases.

The report also pointed out that although DOD publishes minimum obstacle clearance altitudes (MOCAs) which may in some cases be higher than the minimum en route altitudes, no requirement exists for aircrews to fly at or above the MOCA. The survey team recommended that, when operationally feasible, aircraft should fly at altitudes equal to or higher than the published MOCA along the entire route of flight. Further, the team recommended that all aircraft fly on airways or established routes.

"Minimum en route altitude (MEA) criteria may differ in definition from country to country."

Under South American procedures, aircraft are sometimes cleared below minimum sector altitude and minimum safe altitude prior to starting an approach. This is acceptable only down to the minimum en route altitude of the airway being flown. The report cautioned that aircraft cleared below sector altitude must not deviate from the airway centerline until an approach is initiated.

"In many instances, terrain criteria for procedure turns, holding patterns, and approaches do not conform to the United States criteria."

Notam support for aircrews operating in Central and South America leaves a lot to be desired, so aircrews operating into these areas should obtain destination airport notams from Albrook Radio.

APPROACH PROCEDURES

The numbers and types of approaches vary from country to country and airport to airport. A single NDB facility in some cases is all that aircrews can expect for an approach fix, while other airports are equipped with ILS.

Although DOD and Jeppesen publish nearly identical approaches to some of the airports, there are instances in which minimums depicted on the plates are not the same, so be sure you use DOD plates when they're available.

In many instances, terrain clearance criteria for procedure turns, holding patterns, and approaches do not conform to the United States criteria. That means you'll have to be on your toes when performing any of these maneuvers in South America. Fly the procedures exactly as depicted and stay very close to the indicated course. The margin for error may not be as great as you've become accustomed to in the States.

"When communicating with ground stations, it is important to be specific in transmissions, using standard phraseology rather than aviation colloquialisms and jargon . . . ."

SAY AGAIN

Flying in any foreign country presents linguistic problems, and the South American countries are no exception. When communicating with ground stations, it is important to be specific in transmissions, using standard phraseology rather than the aviation colloquialisms and jargon that often punctuate stateside flights. The crew of the aircraft accompanying the team found that it takes a lot of close monitoring and an occasional "say again" to fully understand what the controllers are trying to convey. And they probably find it just as difficult understanding transmissions from MAC crews.

Navigational charts, approach and missed approach procedures, instrument departure procedures, and the depicted approaches themselves should be thoroughly studied and measured against terrain. Coordination with the navigator could prove invaluable to pilots in this respect and might prevent some very serious problems later on.

The countries visited by the team take a great deal of pride in their facilities. Some countries, with older, outdated equipment, are taking steps to improve this situation. But such improvements take time and money. Meanwhile, the name of the game for MAC crews should be caution and awareness while operating south of the border.

ARRS Supervisor of Flyin

by Capt Carl A. Kiburtz
56 ARRS
Korat RTAFB, Thailand

When a Supervisor of Flying glances over his logbook after a long shift, what he sees should reflect the events of the day and just about depict in a nutshell how things went.

Capt Carl A. Kiburtz, an airborne mission coordinator in the 56 ARRS, Korat RTAFB, Thailand, did just that during a SOF tour a few months ago. And much to his surprise, after a few dozen deft strokes of the pen, his logbook entries were transformed into the following verse:

0703 Two-one-six is the plane; the SOF makes the scene.
Poised on the ramp, it's an OR machine.

0712 The enlisted arrive, check the seven eighty-one,
It says that last night a Dash One was done,
But somehow the plane was not locked for the night,
So another Dash One will be pulled before flight.
With two engineers, it shouldn't take long,
While the load does the "F," they do the power-on.

0753 An engineer has a sad find to attest.
Number four fire light can't pass the test.
Maintenance is told and they go right to work,
With circuit test meters, they swarm on the Herk.

0756 The officer crew members finally arrive,
Come on now, Nav, don't give me no jive.

0815 The electricians expect an hour delay,
The fire light problem's in number four dry bay.
A control box inside there has got to be changed,
But getting off that panel sure is a pain.
One of the screws just won't come loose,
Please little screw, don't be obtuse.

The slot in the screw is rounded out clean,

Sings the Flightline Blues

Sheet Metal's been called, with their drilling machine.

0820 Engineers advise that they've finished pre-flight.
The plane is all ready — except the fire light.

0850 Sheet Metal finally digs out the screw,
Hope the electrician soon will be through.

0935 Work still continues in number four bay.
But the old control box just won't give way.

0955 The electrician finally removes the bad part,
Fifteen more minutes and the engines can start.

1020 The fire light checks, the panel's put on,
From this ramp the crew soon will be gone.

1030 The crew's in their seats; start the GTC,
Now pull out the chocks and clear number three.
Those T-56s sure put out a racket.
Without noise protection, your ears could not hack it.

1037 The marshaler gives the come ahead sign.
The bird leaves the blocks, though not quite on time.

1050 Our plane has a problem, its engines' low speed,
Another malfunction is not what we need.
The flight control check has proven unsat,
The aileron boost pack's where the problem's at.

1105 With Hotel Two following close behind,
We taxi our bird right back to the line.
The aileron boost pack will have to be changed,
The mission is scrubbed, the schedule rearranged.

1115 The SOF enters crew rest at an opportune time,
Tired from the rigors of a day-long rhyme.

Mishap with a Moral

Miscalculation

While night landings may be more difficult than day landings, landing after breaking out of the weather during a night instrument approach provides an even greater challenge. Although sufficient optical and electronic glidepath data exists at most modern airports, potential danger awaits those who choose to ignore this information. This is an account of an accident that demonstrates just how important this final, visual phase of an instrument approach can be. The pilot in this accident was a veteran airline captain with thousands of hours.

The Events

The aircraft proceeded inbound on the instrument approach to an island airport. The weather was estimated at 1,600 foot broken, rain showers, and winds gusting to 25 knots.

Approach control advised the pilot that heavy rain was obscuring the runway lights and it " . . . appears we've had power failure at the airport." But the copilot reported that the aircraft was receiving proper signals from the VOR and ILS and that he could see the runway lights. The puzzled controller asked the pilot to repeat his sighting, and the copilot confirmed that the lights were clearly visible from the cockpit. A few seconds later the copilot reported the aircraft's position as five miles from the runway. The controller issued landing information and the copilot acknowledged. This was the last radio transmission from the aircraft. But the cockpit voice recorder provided investigators with cockpit conversation.

The aircraft was established on glidepath at about three miles from the runway. The captain told his copilot, "Keep your eye on it. I'll stay on the gages right here." Between two and three miles the windshield wipers were started and the flaps were lowered to 50 degrees. The aircraft had climbed slightly above glidepath when the captain asked the copilot to inform him when the runway was in sight. The copilot reported, "Now you have the runway," as the aircraft began a gradual descent toward glidepath. A short time later the copilot reported, "You're a little high." After this the average rate of descent increased from 690 f.p.m. to 1,470 f.p.m.

During the last 15 seconds of flight the radio altimeter warning tone sounded twice. During the last tone, the copilot advised, "You're at minimums — field in sight." The aircraft was below glidepath by now and about one mile from the runway. "Turn to your right," said the copilot. "Hundred and forty knots."

The aircraft momentarily leveled off and then started the rapid descent again. It hit trees, continued through the jungle, and struck a three-foot high lava rock wall; the plane finally came to a stop 3,900 feet short of the runway. Of the 101 occupants, 97 died.

NTSB Anaysis

The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the failure of the pilot to correct an excessive rate of descent after the aircraft had passed decision height. NTSB stated, "Pilot technique, cockpit discipline, and crew coordination were disregarded when the captain allowed the aircraft to depart from an established, normal rate of descent."

NTSB further concluded that about 23 seconds before impact the captain apparently went visual. Three seconds later the copilot's "You're a little high" was followed by the unusual rate of descent; therefore, after the captain went visual, he probably did not refer to the instrument panel to monitor the glidepath data, the vertical velocity, or the barometric altimeter — and he apparently disregarded the VASI. These would have shown that the rate of descent was too great and that the aircraft was below glidepath. The copilot further complicated the

on Short Final

situation by failing to make required altitude and vertical velocity awareness callouts to alert the captain to his rapid descent. During the latter portion of flight, the captain may also have experienced visual illusions which could have caused him to believe the aircraft's altitude was higher than actual.

The NTSB noted that there had been inadequate altitude callouts, inadequate instrument cross-checks by the pilot not flying the aircraft, and inadequate procedural monitoring by other flight crew members.

Moral

Night landings over unlighted terrain demand close scrutiny of all available approach aids. Glidepath aids include the ILS glidepath, VASI, and DME used in conjunction with precomputed altitude versus distance for a desired glidepath. These are backed up by pilot judgment and technique and standard procedures. Visual illusions affect judgment and can cause a pilot to misjudge his altitude and proximity to the runway.

NTSB stated in part that, of the many factors that can lead to visual illusions, there are several that could have caused the cockpit crew members to believe that they were higher than normal during the final approach. These include haloing and runway foreshortening. Rain can affect the pilot's perception of distance to the approach end. Haloing of runway lights is caused by diffusion of their glow and thus can cause the lights to appear less intense. This would lead the pilot to conclude that the lights were farther away than they actually were. On occasion, rain causes lights to appear larger (but not brighter) and the pilot believes he is closer than he actually is. In either case, the pilot would be prompted to descend to an altitude comparable to the perceived runway elevation.

Another illusion, runway foreshortening, could have had an effect on the crew. The heavy rain pattern, which was moving slowly down the runway toward the approach end, would have caused the physical dimensions of the runway to appear to decrease, thereby leading the pilots to believe that they were high on the approach, concluded the NTSB.

What effects these false perceptions may have had on the accident are difficult to determine. However, the possibility that visual illusions influenced the crew cannot be dismissed completely, since the copilot (he lived for three days following the crash) stated, ". . . just prior to impact everything looked normal."

Darkness obscured visual cues outside the cockpit, making many of these visual illusions possible influences on the pilot. Other possible factors are wind shear affecting the airspeed and attitude control at the critical phase of flight or rain masking the VASI. One puzzling point was the copilot couldn't remember seeing the VASI, although he remembered seeing the runway lights eight miles out.

This accident provided some basic reminders for safe night approaches. Flight instruments should not be abandoned after "breaking out." Cross-checking will help you stay on glidepath when in close. Staying on glidepath requires peak concentration. And if you're not on glidepath, maintaining proper approach speeds, normal deck angle and runway "picture" will become more difficult. VASI should be used when available. If only the red lights are showing, it may be time to push the throttles forward and go around. Check the rate of descent table in the front of FLIP Terminal for your ground speed and desired angle of descent. Use this figure to back up your approach.

Landing on a runway without glidepath data during periods of marginal weather can be a sporty event, but with ILS, VASI, and DME available, visual illusions can be overcome. Just remember to keep the instruments in your cross-check until you're over the threshold. This can prevent you from entering a rapid descent short of the runway.

"Rog

When two radar blips signal converging courses, problems are in the making. Only one pilot has filed IFR and the weather is closing in.

Frank Newberg and Hoyt Becker, a couple of businessmen from Oregon, stood looking at the jar of lime-colored fuel that had just been drained from the left wing tank of the Cessna 182.

"Looks okay to me. No water at all," Frank smiled as he tossed the contents of the jar into the tall grass at the edge of the parking ramp. Hoyt rolled his eyes in amusement.

"Why do you guys always do that?" he asked, bugging his coworker. "There's a fuel shortage on, you know." He laughed at his own joke, picked up the two overnight bags and wedged them into the plane's luggage compartment.

"Go ahead and strap in when you get the luggage taken care of. We'll be off in a few minutes. We'll be in Port Angeles by ten-thirty."

Frank made a quick walk-around inspection of the red and white Cessna and Hoyt, after a brief struggle with his seatbelt, settled down to wait for his business partner.

In a few minutes Frank eased into the pilot's seat and began setting up the cockpit for engine start.

"Just so you don't sit over there in total ignorance, old buddy, I'll bring you up to date on the flight conditions." Frank liked to pull a chain occasionally, but was always careful to brief passengers on weather conditions. Had been ever since a woman friend had threatened to jump out of the plane when it suddenly encountered light turbulence.

"Flight service says we'll have an 8,000-foot overcast and light rain over Puget Sound. The real nasty stuff won't get here until this afternoon. Know where we'll be by then?"

Hoyt, who wasn't too fond of flying even under the best conditions, replied mockingly, "If you live up to your promises, which you usually don't, we should be on the charter boat concluding the deal over a martini on the rocks. Unfortunately for us, though, the weather forecasters up here are lousy."

"Settle down, settle down. I forgot to bring tranquilizers for squeamish passengers," Frank grinned. "Just remember, we can always set it down or turn around if the weather gets bad." He rotated the engine primer into the locked position and opened the plexiglass window slightly.

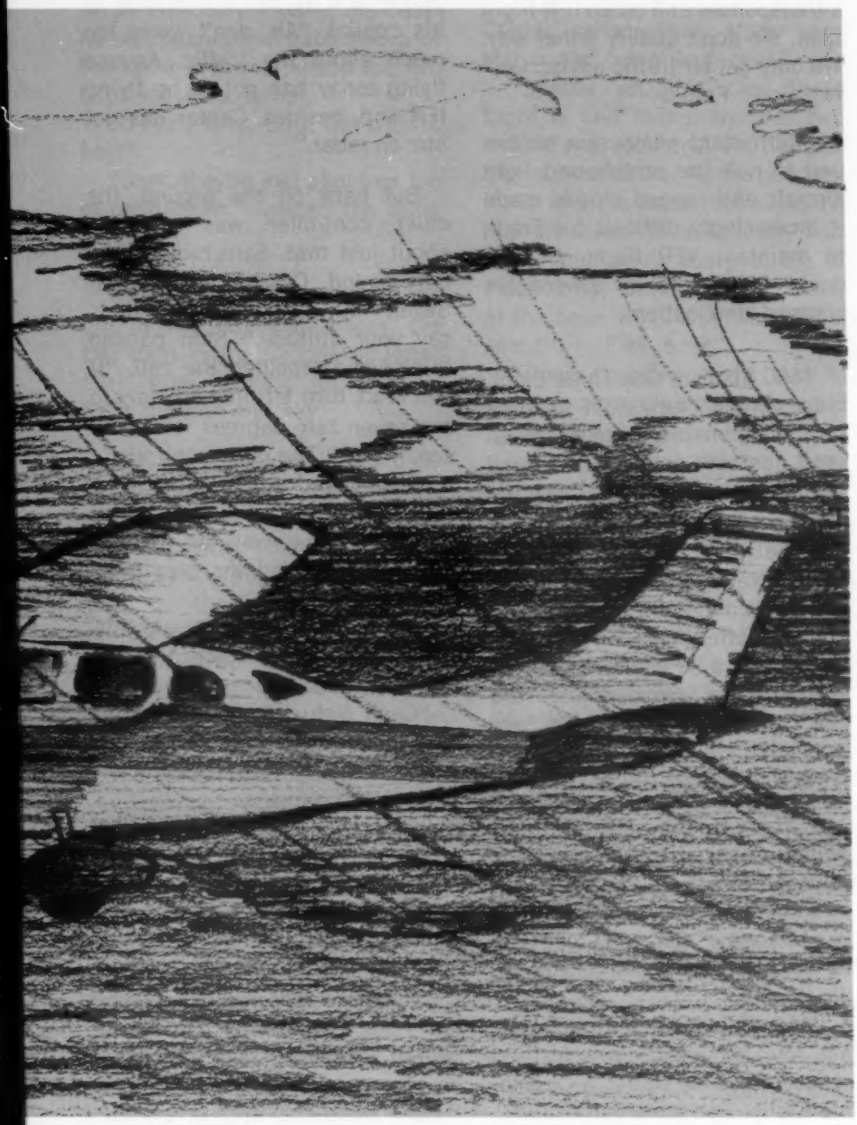
"Prop clear," he called.

* * *

Just 80 miles away, Capt Dick Thorp was climbing up the flight deck stairs of a C-141. His copilot, Lt Bud Kern, was already in place and had just copied the ATC clearance.

er, No Joy"

by Capt A. R. Barbin
Associate Editor



"I got the clearance, boss. Cleared as filed. No delays expected."

"That means," responded the aircraft commander, "that it's time to get the show on the road. Before starting engines checklist."

Ten minutes later the Starlifter, loaded with six pallets of fruit and vegetables for Adak and Shemya and a C-130 engine for Elmendorf, turned slowly onto the long runway.

* * *

Deep within a dark, catacomb-like air traffic control center, radar controllers were monitoring ghostly radar presentations and guiding aircraft in all directions. The chief controller shadowed his way over to one of the radar consoles.

"Mike, I'll watch the scope while you take a coffee break."

"Sounds fine, chief. Lemme bring you up to speed. Just picked up a United stretch eight inbound from Chicago out of two zero zero for twelve thousand. Western Six Forty-two, outbound to Frisco passing seven thousand. Got a VFR Cessna approaching Olympia at seventy five hundred — no transponder. A Northwest DC-10 just departed for Minneapolis. Ah, here he is passing twenty eight hundred. A MAC 141 should be departing the Air Force base in about ten minutes for Elmendorf. Well, that's it. Pretty quiet this morning," commented the junior controller.

"Hope it stays that way for

No Joy

awhile. See you in a bit, Mike," replied Sam Culpepper, chief controller.

* * *

The deepening corkscrew low pressure area off the coast picked up speed and moved inland, spreading saturated cloud bands well ahead of the front. Ceilings dropped steadily and rain came down harder. Beneath the darkening sky, the Cessna droned steadily northwestward.

"I thought you said light rain, Frank. I can hardly see the nose and we've been skirting in and out of the clouds," complained Hoyt over the drone of the engine.

"I know. I'll drop down a couple thousand feet to see if we can get out of this stuff — Seattle Center, November Seven Nine, Two Two Two Quebec, over Olympia, descending to 5,500, over."

There was no reply. Growing somewhat concerned now, the pilot tried again.

"Why don't you try your other VHF set?" suggested Hoyt.

"It's, ah — the other VHF doesn't work. Been meanin' to get it repaired . . . Seattle Center, November Seven Nine Two Two Two Quebec transmitting on one two seven point six, over.

"Nothin' but static. I think we've lost our only good transmitter, Hoyt."

"What do we do now? Can't we turn around and land at Olympia?"

"No, the weather is looking a little better to the north so we'll keep on going. I'd better pull in some more carburetor heat. I'd sure like to know how all this weather got in here so quick. Well, things could be worse. Still have plenty of fuel."

"Doesn't traffic control use radar to separate flights?" Hoyt asked his companion.

"Only for planes equipped with a transponder and on an IFR flight plan. We don't qualify either way. We only get air traffic advisories," explained Frank.

Intermittent heavy rain continued to pelt the northbound light aircraft and ragged clouds made it increasingly difficult for Frank to maintain VFR flight. But he decided to press on toward his planned destination.

* * *

"MAC Six Zero One Three Eight, radar contact, turn right to three zero zero, maintain seven thousand, contact Seattle Center three zero seven point eight," the departure controller directed.

As he monitored a kaleidoscope of radar returns, a weak, intermittent blip caught the veteran controller's attention. "That's the Cessna on a VFR flight plan to Port Angeles. Wonder just how VFR he really is," muttered Sam to himself.

"Seattle Center, MAC Six Zero One Three Eight passing three thousand seven hundred for seven thousand, over."

"Radar contact, continue climb to — standby." Sam was focusing his attention on the intermittent blip.

"MAC One Three Eight, maintain four thousand until further advised. Possible traffic, a Cessna One Eighty Two at eleven o'clock, three miles, altitude unknown."

"Roger, no joy, maintaining four thousand, MAC One Three Eight," answered Bud, scanning ahead through the broken cloud decks.

The C-141 pilot keyed his interphone and voiced confidently to his copilot, "Ah, don't worry too much about the traffic. Anyone flying today has got to be flying IFR and, besides, Center has got him on radar."

But back on the ground, the chief controller was worrying about just that. Sam radioed the northbound Cessna, "November Seven Nine Two Two Two Quebec, say your altitude." Sam paused briefly and repeated the call. "If you read, turn left immediately to two seven zero degrees for traffic separation." The radar controller's voice betrayed a hint of panic.

As the Cessna bounced along the turbulent airway, its remaining VHF signalled the plea from Center.

"Frank, can you turn up the volume? I thought I heard someone calling us."

"Can't. Volume's all the way up now. Cloud decks are dropping fast. I'm going to take 'er down to four thousand."

* * *

At that moment, in the Center control room, Mike returned from coffee break. "I'll take over now," he said, looking over Sam's shoulder into the scope.

"Hang on, Mike, we got a problem here. The Cessna has disappeared from the scope and may be converging with the MAC bird. I can't raise the Cessna on any frequency."

"MAC One Three Eight, center on guard, turn right immediately to zero three zero, acknowledge."

"Zero three zero, MAC One Three Eight copies."

Both controllers watched the scope anxiously. Finally, the Cessna reappeared and each sweep of the radar antenna pulsed the two blips closer together.

"C'mon, MAC, turn! Get with it, boy!"

"Sam, they're just about on top of each other," warned the other controller.

* * *

Droning steadily north in and out of ragged cloud bases, the two men in the Cessna squinted their eyes, looking for a visual path through the sky.

"Oh my God, Frank! Look out!" yelled Hoyt as clouds suddenly parted and revealed the white and gray Starlifter banking to the right. Frank pulled back on the yoke, but the Cessna's right wing knifed into the left wing of the Starlifter. The front end of the helpless Cessna spun into the Starlifter's number two engine, broke free, and began a spin into the murk below.

"Mayday, Mayday, Mayday! MAC One Three Eight, midair! One Three Eight, midair!"

The controllers looked at their scope in horror. The oversized blip separated into two returns. One return appeared to hover but then slowly faded. The second return arced toward the east.

"Seattle Center transmitting on all frequencies. All aircraft remain clear of the area twenty miles south between the zero nine zero and two seven zero radials of Seattle VORTAC from surface to ten thousand feet. All aircraft on three zero seven point eight contact Center on three two three point five.

"MAC One Three Eight, Seattle Center, when able, state your status and intentions, over."

"Seattle, ah, MAC One Three Eight is still flying. Number two engine exploded and, ah, number one is shut down. Numerous fuel leaks and ruptured fuel tanks on the left wing. We're in pretty bad shape but we're going to try to make it to runway one six back at the base. Request vectors for a straight in PAR, over."

"Roger, continue right turn to one one zero, cleared to descend to one thousand six hundred at pilot's discretion," advised Sam, wiping the sweat from his face with a napkin.

Still streaming fuel from its perforated wing, the wounded bird intercepted glide path and rocketed down final without the benefit of flaps. Over the runway threshold the aircraft commander retarded the two remaining throttles and plunked the Starlifter firmly on the runway. Without anti-skid to modulate optimum braking, the Starlifter hydroplaned, its brakes locked, and the tires blew. The aircraft swerved sideways down the rainswept runway and ground to a stop ninety degrees to the centerline.

The pilots stepped shakily down the crew entrance ladder. Both showed evidence of extreme emotional pressure. Slowly they walked toward the tail of the airplane to check the damage. A three-foot section of the Cessna's wingtip was still knotted in the flap section. A curled prop protruded from number two pylon.

"Bud, do you think anybody could have gotten out of that Cessna?" ventured Dick, his voice tight with emotion.

"Don't know," muttered his copilot.

"Maybe we should have been looking closer. But how in the hell could we have seen him in time, anyway? What was he doing at our altitude? Whose fault was it? Ours?"

By the time the flight surgeon had assisted them into the awaiting ambulance, both pilots had lapsed into silence.

"You fellows feeling okay?" the surgeon asked softly.

"Yeah, but we could be a lot better," replied Dick as the vehicle rolled to a stop at the emergency room entrance. "A hell of a lot better."

* * *

This account is fictitious, but similar accidents have dotted the history of aviation. Mixed IFR and VFR traffic is one of the most serious hazards facing flight crews in today's crowded skies.

Perhaps technological and procedural advances will render a safer flying environment in the years to come. But for the immediate future the responsibility to maintain separation during visual flight conditions is that of aircrews, regardless of the type of flight plan they have filed. In essence, "see and be seen" remains the final barrier between an uneventful flight and a mid-air collision.

The Ace of Aerospace makes his terrorific tactical debut in one of MAC's newly assigned C-130 tactical airlifters.

"What a break, Sammy!" exclaimed the Rotund One to his right-seater. "We're scheduled to fly to my old stomping ground for a static display. Seems they're having a parade and open house so the headquarters weenies can get reacquainted with the backbone of tactical airlift — the Herky Bird."

Long Suffering Sam eyed his aircraft commander skeptically. A static display, he thought. That'll mean the boss will want to make like a Thunderbird on arrival and departure, and expound at great length to the curiosity seekers about his former days in the C-130 when it was previously in MAC.

"Just think," continued the Paunchus Pilot, "we can put on a show for the troops. We'll do a peeloff and make a full-stopper from an assault landing. On departure we'll make a max-effort takeoff. Should be quite a demonstration of routine tactical airlift flying."

The copilot shuddered, remembering that his boss had just recently completed his requalification check and was far from proficient at the stick. "Sir, I don't think those maneuvers are on the mission setup. We're to fly to Scotch and land — period. Tactical maneuvers are programmed into the training sorties."

"Phew. The trouble with you, m'boy, is that you lack 'elan. You don't have the required spirit to press for victory. Where's your adventure? Ummm — remember well when I cut my teeth in this tactical business back in fifty-four."

"Did you have to do peeloffs and assault landings back then?" questioned the harried assistant.

"Did we? Why, we seldom had wings level in those days, especially the boys in the dollar nineteens. Why they did all sorts of gyrations to keep the enemy off their tail, er, tails, heh, heh."

Sensing the futility of changing the Master Manipulator's plan, the copilot began preparation for flight. As he located the mission kit under C. R.'s baby-blue, hand-tooled traveling bag, his aircraft commander stopped him.

"What're you doing, m-lad? It's time to put life into our brown

and green trash machine. We have to be on the ground at Scotch by 1430—that's the time the parade begins and they don't want us to make a lot of noise during the ceremony."

The younger pilot continued inventorying the mission kit as they scurried down the ramp to base operations.

"Sir, I can't find the setup sheet. I need the times —"

"You file the clearance, Sammy, and get the map kit. I've got to send a message and then get a bite to eat. Meet you at the ops center in twenty minutes. Now don't delay, m'boy." With this the Aerial Ace waddled off down the hall.

After getting a weather briefing, checking notams, and filing the clearance, the copilot checked the contents of the navigation kit as he spotted the Connoisseur of Gastronomical Delights approaching with a chagrinned look.

"Let's go, Sammy. Would you believe the cafeteria is closed for cleaning? It's a conspiracy, I tell you. Why don't they clean the place at night when the combat crews aren't around? Oh, well, we'll get a bite from the flightline snack wagon."

"Yes, Sir. By the way, do you have the mission setup? I can't figure these times out. We must have an extra half hour built into the trip or something. Or else the takeoff time you gave me is wrong."

The Idol of the Airlanes shrugged and said, "Now don't worry about times and such. Let the field-grader do that. How about calling us a bread truck to take us to our awaiting Lady."

The Terrorific Twosome exited the crew bus at a camouflaged turboprop to find Sergeant Torque standing beneath a wing munching on a sandwich. The Master Manipulator of Wires and Tires mashed out an Egyptian Oval and pocketed his ebony holder.

"Aww, you mean the roach coach has already been by here, Sergeant Torque? Oh, me. It never ends."

"Yes, Sir, it came by a few minutes ago. The man said he had to return to the warehouse to replenish his truck. It'll take him at least forty-five minutes."

"What'd I tell you, Sammy? A conspiracy, right? Well, we'll show 'em. They don't expect a combat crew to fly on an empty stomach. Since we don't have to be at Scotch until 1430, we'll have Sergeant Torque fetch us some flight lunches from the inflight kitchen."

"Do you think it's wise to miss our on-time departure just for a flight lunch, Sir?" asked the right-seater. "After all, we only have a short flight."

"You never learn, Sammy. One thing you must learn, if you plan to upgrade, is to feed your horses before you put them to work. Otherwise, they'll sit down on the job. And in this case, we're the horses."

Twenty-five minutes after scheduled takeoff time the C-130 lifted off the runway and turned toward destination.

"Here's what we'll do when we get to Scotch." The Pudgy Pilot tugged on his emerald green pigskin gloves as he visualized an aerobatic debut with his empty aircraft. "We'll cancel IFR, stay high until the last minute, and descend to pick up redline airspeed. On initial approach, Sammy, tell tower we'll be doing a peeloff and an assault landing. The whole base will be out watching the parade assemble so we'll really surprise the crowd. I'll demonstrate how this bird can stop on a dime."

The aircraft droned on toward destination as the Silver Tongued Fox continued his monologue of intended maneuvers. His most recent tactical airlift expertise, he explained, was accumulated during a "combat" tour at CCK. How sweet it is to be back in a cockpit job, he thought — quite a reward for a job well done as a staff officer.

"Sir, do you want to run the descent checklist?" questioned the copilot, jarring the Lothario of the Airlift Game from his reverie.

"Err, yes. Stand by for briefing. We'll peel off with six zero degrees of bank, roll out on downwind, and get the before-landing checklist out of the way. Then I'll fly a steep approach to that abandoned assault strip alongside the runway. We'll really show the crowd what a short runway we need for assault work. I'll reverse all four props about five feet in the air — that way, by the time we touch down, we'll be about ready to stop. The generals will probably want to make that a standard maneuver after they see what it can do."

Sergeant Torque's head shot upright. "Ah, Sir, you say you're going to reverse in the air? Isn't that pretty hairy?"

"Rest easy, my man. You're not flying with a fledgling. Although I've never actually done the maneuver before, I've spent many an hour delving into all facets of tactical airlift. It's merely a matter of timing."

"Well, Sir, may I remind you that any reversal above 130 knots may cause flameout problems, and an airborne reversal, well —" The engineer tried to discourage

C.R. Terror

the aircraft commander from the assault landing idea.

"Preposterous! You and Sammy are cuts from the same deck of cards." The pilot heaved his bulk into the seat as he rationalized that his plan was perfectly safe and would be just the ticket for the headquarters folks to accept the C-130 with pride.

And so it went as the time approached 1400. Just a few minutes to go till the parade would begin, C. R. thought. He must hurry to get his aircraft on the ground.

"Scotch Tower, this is Herky One Two. Initial for a three sixty overhead pattern, over." Sam displayed acute apprehension as he spoke.

"Roger, One Two. Winds are three four zero at five knots; cleared to land runway three one," responded the tower operator.

"Tell him we want the assault strip, Sammy," interjected the Aerial Ace as he fingered the throttles.

The right-seater obliged. "Uh, Scotch Tower, request an assault landing, over."

After a long pause the tower responded. "Say again, Herky One Two."

"Roger, we want an assault landing, over."

"Err, Roger, you're cleared to land on runway three one, over."

"That's it, Sam" said C. R., "that means we're cleared to land on the assault strip next to runway three one."

"Sir, doesn't the clearance mean to land on the concrete runway?" asked Sergeant Torque.

"Naw, it's just what I said, Sergeant Torque. Stand by — here we gooooo! Wheeeee! Gear down — checklist."

The C-130's wings whipped rhythmically under the sudden strain of the 60-degree bank. After gaining 300 feet in the turn, the Arrogant Aviator turned toward final with excess altitude and airspeed. Beads of perspiration glistened on the foreheads of the crew as they realized the approach was developing into more than just an assault landing.

The copilot broke the spell. "Sir, we're a little high and the airspeed is one hundred and sixty-five knots. Maybe we should take it around. Hey — it looks like the parade has already begun!"

"Whaddaya mean?" chirped the pilot. "See, it's only fourteen-fifteen. We're still fifteen minutes ahead of the parade. We'd better get it on the ground though. Assault strip dead ahead at twelve o'clock. Stand by to reverse."

The Hercules descended at 1,500 f.p.m. toward the faint outline of an abandoned strip in the grass alongside the runway. At 20 feet and 140 knots, the pudgy paws yanked the throttles up and back.

"Sir — er, go around, go around! We're too hot!" The copilot stammered under the strain of his aircraft's unusual attitude.

As the parade halted in place to begin the awards ceremony, hundreds of onlookers gasped in awe at what they saw. The C-130, just a few feet in the air and appearing to be in a crash dive, suddenly shut down two of its engines on one side, shuddered, spun through 180 degrees, and slammed down backward onto the grass. The machine rolled for a short distance, sat on its tail, and stopped with its nose cocked up in a smart salute.

"Yoweeee! We must have been hit by a gigantic gust of wind," offered the World's Greatest Aviator as he cowered lower into the seat. The copilot and engineer completed the emergency engine shutdown procedures.

Sam grabbed the mission setup sheet as he exited the broken aircraft. He scanned the numbers in embarrassment as he stood outside awaiting the arrival of the firefighting equipment. Suddenly, it came to him.

"Sir, the parade began at thirteen-forty, not fourteen-thirty. You had the times all wrong. The parade was almost over when we peeled off," rattled the excited and confused copilot. "Boy, I bet the general is mad."

"What? You mean our demonstration went on during the parade, not before?"

"Yes, Sir."

"Arg —"

As fire trucks, staff cars, and the crowd descended upon the scene, the Ruffled Rationalizer retorted, "Well, Sammy, look at it this way. The boys at Scotch saw an exceptional demonstration of tactical airlift. Oh, by the way, Sammy, don't forget to log an assault landing in the training form."

Accident Statistics for 1974

The Military Airlift Command major aircraft accident rate was the second lowest in the Air Force during 1974. But, in spite of the good showing, the command's major accident rate has increased steadily over the last two years.

Seven accidents last year accounted for a 30 percent increase over the 1973 rate as the number of flying hours dipped sharply. The minor accident rate decreased in 1974.

MAC flew 491,308 hours in 1974 compared to 580,184 in 1973 and 755,626 in 1972.

Accident rates (per 100,000 flying hours) are:

	1972	1973	1974
MAJOR			
MAC	0.53	1.03	1.40
USAF	3.00	2.30	2.90
MINOR			
MAC	0.40	0.52	0.20
USAF	1.00	1.00	0.90

The following compares the 1974 major accident rates by command:

ATC — 1.1	TAC — 3.2
MAC — 1.4	USAFE — 3.7
SAC — 1.6	PACAF — 3.9

ADC — 6.7

MAC's 1974 accidents

Major — HH-1H, 11 Feb 74, Ogden Municipal Airport, Utah. The helicopter began oscillations during a hydraulic boost-off approach to a hover. The pilot lost control and the rotor blades contacted the ground. One pilot received major injuries and two pilots received minor ones.

Major — TH-1F, 23 Jun 74, Vandenberg AFB, Calif. The helicopter flamed out during a night overwater SAR mission, prompting the pilot to ditch the aircraft. All four crew members egressed safely and were rescued.

Major — UH-1F, 11 Jul 74, Fort Huachuca, Ariz. Following in-flight vibrations, the pilot attempted a precautionary landing. Prior to touchdown a tail rotor gear box failed and tail rotor response was lost. The helicopter contacted the ground and rolled on its side. Both pilots escaped without injury.

Major — C-141, 18 Aug 74, La Paz, Bolivia. The aircraft flew into a mountain while descending for a night landing. All seven crew members were killed.

Major — C-5, 27 Sep 74, Clinton Municipal Airport, Okla. A fire developed in the wheel well and the pilot made an emergency landing on a civilian runway. The aircraft ran off the far end and came to rest in a field. The aircraft was destroyed, but all nine crew members escaped injury.

Major — WC-130H, 12 Oct 74, South China Sea. The Air Weather Service aircraft disappeared at sea on a routine tropical storm reconnaissance pattern. Its six crew members were lost.

Major — C-141, 16 Dec 74, near Bangor, Me. The left side of the cargo ramp unlocked and an explosive decompression followed. Subsequently, the cargo ramp, pressure door, and petal doors separated from the aircraft. No one was injured.

Minor — C-5, 1 Mar 74, U-Tapao RTAFB, Thailand. An engine caught on fire shortly after takeoff. The aircraft returned to the base following engine shutdown. There were no injuries, but engine damage met the minor accident criteria.

Much can be learned from these accounts. Some of the accidents were caused by materiel failure while others were largely due to human error. Where the human element is involved in aircraft operations, whether in flying the machine or maintaining it, the basic question is: Will we be up to the challenge in 1975 to prevent those accidents caused by personnel error? We operators can't afford not to be.

Big Bag of Wind

A few months back, a couple of F-111s at a western base received minor damage during ground towing operations. Sounds like human miscalculation bought a couple of wingtips, right? Not this time.

Earlier in the afternoon, the base had received a weather warning for wind gusts up to 50 knots, and the weather detachment notified maintenance control. Maintenance control and the operations center began to implement severe weather procedures out on the ramp. Maintenance personnel began towing aircraft and support equipment from the ramp to areas secure from the steadily increasing winds. Thirty minutes after Weather issued the first warning, another was put into effect calling for sustained winds of 50 knots and thunderstorms. The winds struck with gusts up to 70 knots and loose debris from the entire base catapulted into the frenzied sky. An object struck and crazed an F-111 windscreen while a particularly strong gust lifted and twisted part of a wing on another swing-wing fighter.

Damage to aircraft and support equipment was minimized by the prompt response of flight line personnel as the flight line was transformed from one of calm to one of trauma in less than an hour after the initial weather warning.

A Real Shocker

As the tanker entered an area of heavy precipitation, heavy ice blanketed leading edge surfaces and severe turbulence rocked the aircraft. Suddenly, a bright flash accompanied by a loud bang illuminated the cockpit. Both pilots received mild electrical shocks and the aircraft radome ripped off. Airspeed began fluctuating 25 to 30 knots and the pilot's airspeed indicator read 30 knots lower than the copilot's.

The pilot established a positive climb attitude on his ADI and throttled back to military rated thrust. Altimeter and VVI confirmed a climb. The navigator supplied ground speed information from his equipment.

Finally out of the crud at 16,000 feet, a scheduled "receiver" rendezvoused with the tanker, confirmed radome separation, and looked over the aircraft for other damage. The tanker continued to its alternate and, with a chase aircraft radioing approach speeds, completed an uneventful recovery.

Meteorologists agreed that the weather conditions at the time of the incident were conducive to electrostatic discharge. There were no thunderstorms in the area.

Comedy of Terrors

Two airmen who will forever remain anonymous, but for the sake of clarity we'll call Sergeant Heavy and Airman Lightweight, sat calmly inside the C-141, awaiting a night proficiency parachute jump. Nearing the drop zone, at 1,000 feet above the ground, the two men prepared for their nylon penetration. The prebriefed jump sequence called for Airman Lightweight to jump first, followed by the more experienced jumpmaster, Sergeant Heavy.

When the "green light" illuminated, Airman Lightweight bolted away from the aft troop door, followed immediately by Heavy. During their descent, Sergeant Heavy passed Lightweight. At approximately 40 feet above the ground, Sergeant Heavy positioned himself for landing, but little did he know that his prelanding maneuvering had placed him directly beneath Lightweight. Sergeant Heavy's parachute canopy blanked airflow into Airman Lightweight's canopy, causing it to partially collapse and take on the flying characteristics of an anvil. Meanwhile, Airman Lightweight sank rapidly into Sergeant Heavy's canopy, creating a second anvil. Both men hit the ground with a thud, or, rather, Sergeant Heavy hit the ground with a thud and Airman Lightweight hit Sergeant Heavy like a billiard ball rammed into a side pocket. Sergeant Heavy suffered back injuries. Cause of this unusual accident was listed as a loss of night perception by Airman Lightweight due to his lack of experience.

A Hole in the Sky

Shortly after takeoff, a C-130 crew elected to deviate south of flight plan course to avoid severe weather. The C-130 leveled at 16,000 feet in VMC conditions. The route ahead appeared free of buildups as the Herky Bird neared its destination. But after completing a turn to the northwest toward the airport, the Hercules entered light stratus clouds and suddenly was hit by a moderate to severe downdraft. Seconds later, the loadmaster, who was

in the cargo compartment alerted the pilot that he was injured and needed assistance. The pilot again diverted around weather and landed the aircraft at a civilian airport. The loadmaster had suffered a back injury and was evacuated to a local hospital.

We all hear it over and over, but it still rings true: Proximity to a bad weather area should prompt all crew members and passengers to fasten seatbelts.

Qs

Sprung Life Raft

A C-130 flying on autopilot unexpectedly climbed 500 feet and then dropped back down again, yawed to the left, and lost ten knots of airspeed. The surprised pilot disconnected the autopilot and retrimmed the aircraft, but the crew felt a mild vibration from the tail section. After 15 minutes of aircraft troubleshooting revealed no obvious difficulties, the aircraft suddenly regained the lost airspeed, trimmed up properly, and stopped vibrating.

At destination, post-flight inspectors found the left inboard 20-man raft and accessory kit missing. Investigators concluded that the hatch popped when trapped air in the raft expanded as the aircraft climbed. The vacuum created by this opened hatch apparently sucked the raft out and caused it to wrap around the horizontal stabilizer.

Nomex News

Your Nomex zoom bag is made from a flame-retardent synthetic fabric. The material is light in weight and will not support combustion, but will begin to char at 700 to 800 degrees F. It has good abrasion resistance, similar to nylon, and is also nonabsorbent like nylon and other synthetic materials. Because of the nonabsorbent characteristics of Nomex flight suits, cotton underwear should be worn for optimum comfort.

If JP-4, grease, or other combustible material is imbedded in the fabric, these agents will burn at their normal flash points even though Nomex will not burn until a higher temperature is reached. Assure that your Nomex flight suits and gloves are clean. Laundering will not compromise the flame retardent properties of the Nomex fabric and no renewable flame retardent treatment is required.

Flight Suit Do's

Launder newly issued flight suits prior to use to soften the fabric and eliminate any possible skin irritants.

Launder as frequently as needed at home or in a commercial-type washer using a mild soap.

Turn flight suits inside out prior to laundering. This will reduce "pilling" of the fabric. A commercial fabric softener will also reduce pilling.

Close all zippers. This will prevent damage to the material.

Hang flight suit on a hangar immediately after tumble or drip drying.

Dry clean after every third or fourth wash. This removes body oils that washing will not remove.

Flight Suit Dont's

Don't iron or press the flight suit.

Don't starch. Nomex is permanently fire retardent but the starch will burn.

Don't use liquid bleach. Dry bleach is recommended to help remove odors.

after deadline . . .

IFR NEAR-MISS -- A C-9 flying an air evac mission had just departed an en route stop when departure control advised the crew of possible conflicting traffic. The crew replied that they were in the clouds. Seconds later the C-9 broke through the overcast, and the crew spotted a green and white Cessna 150 or 172 dead ahead skimming the tops of the cloud deck. The aircraft commander pulled the nose up to about 20 degrees, barely missing the light aircraft. At the time of the incident, the Cessna was on a VFR flight plan squawking 1200. FAA is currently investigating.

The next time you're in the clouds and center advises that there's conflicting air traffic in the vicinity, consider asking for vectors around it. Don't assume that just because you're flying IFR rules that everyone else in your piece of sky is doing likewise.

INSTRUMENT PROCEDURE CHANGE -- A message from the Chief of Staff's office has directed an important change to AFM 51-37, Instrument Flying, chapters 15 and 17. This change stresses the need to maintain minimum safe altitudes during the instrument approach phase of flight and is quoted as follows:

> When an approach clearance is received, maintain the last assigned altitude until established on a segment of a published route or instrument approach procedure. Thereafter, published altitudes apply to descent within each succeeding route or approach segment. If uncertain of clearance, immediately request the assistance of air traffic control.

This change should have reached all flying units by now. If you haven't got the word yet, check in with your manuals control officer.

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MILITARY AIRLIFT COMMAND